PROCEEDINGS OF THE

ROYAL ENTOMOLOGICAL SOCIETY

OF LONDON

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ORDINARY MEETING

WEDNESDAY, 2ND MAY, 1951, at 5.30 p.m.

AGENDA

1. Confirmation of the Proceedings of the Ordinary Meeting held on 4th April, 1951.

2. Recommendations of candidates for Fellowship.

3. Announcement of election of new Fellows.

4. Additions to the Library.

Presented.

Balachowsky, A. *Les cochenilles de France, d'Europe, du nord de l'Afrique et du Bassin Méditerranéen. V. Monographie des Coccoidea. Diaspidinae (Deuxième partie) Aspidiotini.* 8vo. Paris. 1950. [The Publishers.]

Godart, J. B., and Duponchel, P. A. J. *Iconographie des chenilles.* 2 vols. Paris. 1832–37. [H. J. Turner Bequest.] In original wrappers.

Nixon, G. E. J. *The association of ants with aphids and coccids.* 8vo. London. 1951. [Commonwealth Institute of Entomology.]

Uvarov, B. P. *Locust research and control,* 1929–1950. 8vo. London. 1951. [Colonial Research Publication No. 10.] [Anti-Locust Research Centre.]

In addition, separates were presented by Dr. J. L. Cloudsley-Thompson, Professor G. D. Hale Carpenter, United States Department of Agriculture, The Smithsonian Institution, Mr. H. E. Box, Mr. K. G. V. Smith, Dr. C. Ferrière, Miss E. N. Marks, Baron C. G. M. de Worms, Mr. J. F. Gates Clarke, Colonel Niall MacNeill, Commonwealth Institute of Entomology, Professor P. A. Buxton, Mr. J. Phipps, Mr. M. Niblett and Mr. H. E. Goto.

5. Admission of Fellows.

6. Exhibits.

Fellows are particularly requested to bring suitable exhibits to the Meeting even though it may not be possible to announce their intention to do so beforehand.

Note.—To avoid congestion in the Library and to enable exhibits to be displayed to greater advantage, a table has been placed in the meeting-room for this purpose. Fellows are asked to place their exhibits on this table, with a suitable explanatory note, as soon as possible on the afternoon of the meeting, so that they are available for inspection there before the meeting opens.

7. Communications.

1. Dr. J. T. Salmon

The Role of Collembola in Zoogeography.

[Abstract.]

The importance of small soil-inhabiting animals as indicators in zoogeography will be discussed. This is based largely on the relatively limited means of dispersal possessed by such organisms. Collembola geographically show an archaic element of almost cosmopolitan distribution; alongside this are several extraordinary cases of discontinuous distribution, numerous cases of genera distributed along zones or "migration routes," and many examples of highly diversified and specialized local faunas resulting from isolation. New Zealand, as an isolated land mass which has had no major land connection with other land masses for a considerable period of geologic time, has evolved what is probably the most diversified and yet specialized Collembolan fauna of any one country; the zoogeographical relationships of this fauna will be discussed and expanded into a discussion of the world distribution of these insects. In dealing with the archaic element it is necessary to distinguish between truly ancient forms and those which have achieved cosmopolitan distribution through the agency of man and his commerce. Geologically, the Collembola are a very ancient group of insects, the earliest fossil coming from the Middle Devonian does not differ markedly from present-day species, and it is the writer's opinion that many of these cosmopolitan species are very ancient and achieved their present distribution in very early geological times. This early distribution can be accounted for by the theory of Continental drift, but this theory cannot account for later distribution of the many more modern specialized genera. These must be accounted for primarily by the development of land bridges from time to time, but evidence would point to the fact that such bridges only occurred in places where they could reasonably be expected to develop and not where, at the present time, vast expanses of deep ocean now prevail. If, on the other hand, Continental drift be disproved in favour of the more or less static condition of fixed Continental masses then the distribution of the Collembola can still be accounted for by land bridges. A primary northern evolutionary centre can be postulated from which migrating streams advanced outwards in all directions. Migration has not necessarily been unidirectional, but reversals of migration probably occurred from time to time, and these, along with isolation or specialization can account for much of the present-day distribution of Collembola. Zoogeographical evidence derived from the studies of soil animals cannot give a complete picture of zoogeography but, integrated with the evidence derived from other groups of animals and plants it can supply a reasonably firm basis upon which acceptable theories of animal distribution can be built.

2. **A ciné-film on the Honey Bee** (10 minutes).

Tea will be served in the Library before the meeting.

The Society's Meeting Room has now been equipped with a 16 mm. Ciné Projector. The Secretary would therefore be pleased to hear of suitable films which could be shown at Ordinary Meetings.

ADMISSION OF FELLOWS

Any Fellow who has not been formally admitted to the Society under Chapter XIV, Section 4 of the Bye-laws and attends the meeting on 2nd May, 1951, is requested to inform the Secretary before 5.15 p.m. on that date.

Festival of Britain and IXth International Congress of Entomology, Amsterdam, 17th–24th August, 1951.

The Council of the Society wishes to assist entomologists from overseas who may be visiting England and Holland in connection with the above events. Visiting entomologists will be invited to use the Society's rooms, but, in addition, it is hoped that some Fellows will be able to offer personal hospitality.

Fellows who are able to offer such hospitality are invited to do so through the Society, by writing to the Secretary indicating whether their offer applies to (1) a particular entomologist, (2) a person interested in a particular branch of entomology, or (3) any visiting entomologist, and to add the nature of the hospitality available.

Invitations relating to the periods immediately before or after the Amsterdam Congress are likely to be of most value to visitors.

JULY AND SEPTEMBER MEETINGS.

Alteration of Arrangements

July.—The Council of the Society has accepted an invitation from the Vice-Chancellor of the University of Manchester to hold the July meeting of the Society in Manchester to enable Fellows of the Society living in the South to meet northern entomologists. The Meeting normally due to be held on 4th July will therefore be replaced by a week-end meeting from **20th to 22nd July, to be held in the University of Manchester.** Further details will be circulated as soon as available.

September.—For the benefit of overseas entomologists passing through London on their way to the Amsterdam Congress, the Council has decided to hold an Ordinary Meeting on **Wednesday, 15th August.** This will replace the meeting normally due for 5th September.

PROCEEDINGS OF THE ORDINARY MEETING HELD ON 4TH APRIL, 1951.

Mr. N. D. Riley, President, in the Chair.

Present, 62 Fellows and 6 Visitors.

The minutes of the Ordinary Meeting held on 7th March were confirmed and signed by the President.

The President announced the death of Lt.-Col. F. A. Labouchere, a Fellow of the Society since 1927, and elected to a second period of service on the Council in January. He also reported the death of Mikhail Rimsky-Korsakov, President of the Leningrad Entomological Society, and the author of numerous papers on a wide range of entomological subjects.

The President announced that Dr. W. H. Thorpe, a Fellow of the Society since 1926, had been elected a Fellow of the Royal Society. This was received with acclamation. The nomination of Dr. C. Potter to the vacancy on the Council caused by the death of Colonel Labouchere was also reported.

The names of the following candidates for election were read for the first time : J. C. de Melo Carvalho, M.Sc., Ph.D., and Max Isbill.

For the second time (taken as read) : M. Bibikoff, I. G. Farwell, Miss M. E. Godfrey, B.Sc., A.R.C.S., E. Gowing-Scopes, R. I. Lorimer and R. B. W. Lowndes.

The Secretary read the names of the following newly-elected Fellows of the Society : Mrs. B. R. Aspoas, Modder " B," G.M., Ltd., P.O. Modderbee, Transvaal, S. Africa ; Dr. J. R. Audy, Institute for Medical Research, Kuala Lumpur, Malaya ; C. L. Bell, 9, Bedford Crescent, Horfield, Bristol 7 ; C. S. H. Blathwayt, M.A., Amalfi, 27, South Road, Weston-super-Mare ; J. D. Bradley, British Museum (Natural History), S.W.7 ; P. J. Burton, 1, Marine Parade, Lowestoft ; J. D. Carthy, M.A., Ph.D., Dept. of Zoology, Queen Mary College, Mile End Road, London, E.1 ; R. W. Crosskey, B.Sc., A.R.C.S., 44, Glebe Hyrst, Sanderstead, Surrey ; L. Davies, Ph.D., Zoology Dept., Science Laboratories, South Road, Durham ; R. L. Edwards, St. Helier, 9, Home Close, Wootton Road, Abingdon, Berks ; Q. A. Geering, B.A., 24, Gunter Grove, Chelsea, London, S.W.10 ; J. B. Gilpin-Brown, Dept. of Zoology, The University, Bristol 8 ; R. A. Harrison, Plant Diseases Division, D.S.I.R., Private Bag, Auckland, New Zealand ; Dr. Henry Hurtig, Defence Research Board of Canada, Suffield Experimental Station, Ralston, Alberta, Canada ; J. R. Leigh, c/o Kwambonambi-Mposa Malaria Committee, P.O. Box 1, Mposa, Zululand ; R. C. Muir, Department of Zoology, Downing Street, Cambridge ; Lt.-Cdr. W. J. Perry (M.S.C.), U.S.N., Office of Naval Research, American Embassy, 34, Grosvenor Square, London, W.1 ; Dr. C. L. Remington, A.M., Ph.D., Osborn Zoological Laboratory, Yale University, New Haven 11, Conn., U.S.A. ; Dr. Eleanor H. Slifer, Dept. of Zoology, State University, Iowa City, Iowa, U.S.A. ; G. O. Stride, 39, Inkerman Close, Horfield, Bristol 7.

Thanks were voted to donors of gifts to the Library since the last meeting.

Mr. G. L. Arora, Mr. I. W. Beresford Nye, Mr. J. D. Bradley, Mr. P. T. Haskell and Mr. F. N. Wright signed the Obligation Book and were admitted Fellows of the Society.

Dr. A. M. Easton exhibited, on behalf of Mr. R. W. Lloyd and himself, a collection of insects made by the British Nepal Expedition, 1950. The specimens shown were taken by Major H. W. Tilman, at the request of Mr. R. W. Lloyd, and came mostly from an altitude of between 7000 and 8000 feet. The collection included a few species of *Apion* and a large number of Phytophaga, many species closely resembling those found in this country.

Dr. H. E. Hinton exhibited a dissection of the larva of *Ephydra riparia* (Dipt. EPHYDRIDAE) showing the muscles *in situ*. The muscles were stained with eosin after all other organ systems had been removed. Photographs of the dissection taken by Dr. T. J. Gray were also shown. He said the most interesting point about the dissection was that it clearly showed that many of the skeletal muscles had lost their primitive metameric relations and arose on the distant margins of segments adjacent to those in which they were inserted. In the Nematocera it had been found that one of the retractor muscles of both the prothoracic and posterior prolegs of the SIMULIDAE, CHIRONOMIDAE and THAUMALEIDAE arose on the posterior margin of the mesothorax and penultimate abdominal segment respectively.

In reply to an enquiry by Professor Varley regarding the technique employed, Dr. Hinton said the top third of the larva was removed with a sharp blade, and

all the body contents with the exception of the muscles carefully picked out. The muscles were then stained in eosin.

Professor G. D. Hale Carpenter gave a paper on the genus *Euploea* (Lep., DANAIDAE) in the South Pacific from Papua to Australia and Tahiti, an abstract of which appeared on pages 12–13.

In the discussion which followed, Professor Buxton said that he and Mr. Hopkins had made an extensive study of the insect fauna of the four islands forming the Samoan group. The eastern and western pairs of islands were separated by a distance of some forty miles, but the variation in their fauna was a puzzle which defied rational explanation. One general truth was, however, illustrated, namely the reduction in the fauna eastwards across Oceania. He said one school of thought maintained that this decline was gradual, but in the other view there was a steady regular reduction as far as Fiji, followed by an immediate large reduction, indicating that the land areas east of Fiji had never been connected with the mainland. He was therefore interested to know which of the theories was supported by the distribution of these butterflies. Professor Carpenter replied that his work bore out the second theory of a rapid decline beyond the edge of the Continental shelf, as evidenced by the fact that while 9 forms of *Euploea* occurred in New Caledonia, 8 in New Hebrides and 8 in Fiji, showing a gradual decline, one form only was found on Tonga.

Dr. Richards enquired as to the precise sense in which the word " form " was used, and Professor Carpenter replied that for the purpose of the present talk he used it in a general sense meaning merely an " entity " which could be distinguished from other " entities." It included species and subspecies, and had no reference to individual variants.

Mr. Zimmerman said that in his view the genitalia of this group of butterflies were not so simplified and primitive as had been suggested. Professor Carpenter said he had not worked on the female genitalia. Mr. Zimmerman also said that, while it was a fact that the continental rocks ended at Fiji, it must be remembered that to the east of that group the islands were all small, and as there was therefore less room for species to develop, they would be expected to have fewer forms. He felt this factor could not be ignored when considering the reasons for the eastward reduction in fauna. Fiji was the most eastward sizable land mass, but even there doubt had now been thrown on the endemicity of the frog fauna.

In reply to a question by Mr. Zimmerman, Professor Carpenter said that male genitalia were too simple to be of much value except possibly if treated statistically.

* Dr. Hinton said that the entire group of butterflies under discussion had evolved since the big movements of continental masses, and their present distribution could not be explained on that basis. He doubted the value of such recently-evolved groups in the study of geographical distribution. He also said he could not agree that the simplicity of the male genitalia was primitive.

Mr. Zimmerman reverted to the origin of the Pacific land masses and said that faunistically that forming the island of New Guinea was originally a part

* Owing to lack of time it was not possible for Professor Carpenter to reply to Dr. Hinton's point at the meeting, and he has since written as follows :

" Dr. Hinton is apparently unaware of the paper by F. E. Zeuner in 1943, *Trans. zool. Soc. Lond.*, **25** : 108–184. On page 173 he points out that there is stratigraphical evidence that the latest earth movements lasted well into the Pleistocene so that ' the advance of New Guinea to its present position, therefore, may have been as late as this, and late enough for the *Ornithoptera*-group to have reached the Solomons before the island chain Moluccas-Solomons was broken.' If ' *Euploea* ' is substituted for ' *Ornithoptera*,' my facts are in accord."

of Australia. Although the mass of the mountains were late Tertiary, a large number of species had nevertheless developed there. Land masses were not necessarily old because they supported a large number of species. Species were evolved rapidly in new ecological conditions produced geologically.

Mr. D. C. Swan spoke on the Hepialid moths of the genus *Oncopera*, native to coastal areas in eastern Australia. He said all known species were confined to a coastal belt with relatively moist conditions during nine or more months of the year. The larvae of several species whose biology was known made vertical silk-lined burrows of characteristic form in soil; they hid by day and emerged at night to feed on the tops of the plants forming the pasture. Some species were capable, in favourable years, of reaching large numbers in sown permanent pastures, in which they might cause widespread damage. The species *O. intricata* Walker behaved in this way in Tasmania, and *O. fasciculata* Walker had come under notice as a pasture pest in south-eastern South Australia, and in Victoria.

O. fasciculata had caused extensive pasture damage in South Australia in recent years, and was at present the subject of investigation by workers at the Waite Institute, Adelaide. Reference was made to the seasonal history of the species. The moths were on the wing during September and October, and engaged in a spectacular mating flight at dusk in the manner already described for *O. intricata*. Eggs were laid freely in the pasture, and hatched in some three weeks; neither eggs nor young larvae tolerated desiccation, and dry weather at this period caused heavy mortality among these stages. Young larvae might be present in heavy infestations at the rate of over 100 per sq. ft.; by the time they were mature the number fell to 8–20 or less. Such numbers denuded a pasture completely, killing most or all plants.

Photographs in black and white and colour were projected to illustrate some aspects of the field occurrence of this insect, and to demonstrate the effect upon pastures of large larval populations.

Dr. Taylor asked whether the massing together of the larvae was due to the activities of man in changing the normal character of the country, and how the insects behaved in areas not modified in this way.

Mr. Swan replied that before human activity changed the character of the territory under discussion, the country was savannah woodland and there were no extensive grassy areas. The first attempts at cultivation were made by taking off a crop. Later the soil was topped with superphosphate and sown with grass for grazing, which proved remunerative. The insect was first noticed in 1935 and by 1937 was increasing. During the war years land development was retarded by lack of labour, but the rainfall was low, so that conditions did not favour the development of the pest. With the return to more normal conditions development was again undertaken, more fertiliser being applied. This, coupled with a heavier rainfall, produced a strong growth of grass in the spring when the eggs are laid, so that enormous numbers of the pest were produced. It now seemed probable that as the present policy produced favourable conditions for the pest, some modification in the agricultural practice would have to be introduced.

In reply to an enquiry by Mr. Hawkins, Mr. Swan said the insect had no effective natural enemies and it had therefore not been possible to attempt to control it biologically.

E. B. BRITTON, *Hon. Secretary.*

The next meeting will be held on 6th June, 1951.

The Protection of British Insects: An Appeal

The following appeal is issued by the Committee for the Protection of British Insects:

The Protection Committee of the Royal Entomological Society of London was instituted in 1925, as a result of many complaints in the entomological journals of that time, concerning the wanton damage that was being caused by a certain number of unscrupulous collectors, which was actually threatening the very existence of particular species. Since its institution the Committee has met with considerable success, and those insects most threatened in 1925 are now considered to be firmly established in their particular habitats.

At the end of the war the Committee was able to resume its full activities, which had been curtailed during hostilities, and in 1947 it was decided to emphasise the importance and representative character of the Committee by inviting the principal entomological societies to nominate one of their members to serve thereon.

Modern agricultural practices, the heavy programme of forestry now in being, and sometimes the generally well intended activities of local authorities often involve threats to rare or local species through the alteration and sometimes the destruction of existing conditions.

The Committee has taken an active part in endeavouring to minimize the risks that have arisen from such causes, and has been careful to co-ordinate its activities with other organizations interested in the preservation of the fauna and flora of the country. With the advent of the Nature Conservancy, with which the Committee has established close relations, and of the International Union for the Protection of Nature, to which the Committee is linked, it may prove possible to do even more in the future to preserve those natural conditions essential to the existence of particular insects.

The success of these endeavours should be sufficient to safeguard rare or local insects of the lesser known Orders, but in the case of the Lepidoptera, it is also necessary to guard them from extinction at the hands of avaricious collectors.

It is with great regret that the Committee must record that from time to time reports are still received of most reprehensible activities by collectors, which may well cause the extermination of rare and local species.

The following is a list of the species in which the Committee is at the moment particularly interested:

Swallow Tail	*Papilio machaon* Linné.
Glanville Fritillary	*Melitaea cinxia* Linné.
Heath Fritillary	*Melitaea athalia* Rottenburg.
Large Blue	*Maculinea arion* Linné.
Blair's Wainscot	*Sedina buettneri* Hering.
Clifden Nonpareil	*Catocala fraxini* Linné.
Lunar double-stripe	*Minucia lunaris* Schiffermueller.
Lesser Belle	*Colobochyla salicalis* Schiffermueller.
Rest Harrow	*Aplasta ononaria* Fuessly.
Sussex Emerald	*Thalera fimbrialis* Scopoli.
Lewes Wave	*Scopula immorata* Linné.
Netted Carpet	*Eustroma reticulata* Schiffermueller.
Dark Bordered-Beauty	*Epione vespertaria* Thunberg.
Rose Plume	*Euenaemidophorus rhododactylus* Schiffermueller.
Fiery Clearwing	*Aegeria chrysidiformis* Esper.

All collectors are most earnestly requested, therefore, to use the utmost restraint at all times in taking any of the above species, in any of their stages, and particularly when adverse factors have reduced their numbers. The indiscriminate capture of large numbers of these species not only may endanger their existence in this country, but also renders more difficult any negotiations being carried out by the Committee in the endeavour to preserve them and their natural habitats.

After mature consideration and full realization of what it entails, the Committee would beg entomologists to report direct and at once to its Honorary Secretary any thoughtless collecting of this kind, which may come to their personal notice, giving the fullest particulars.

The Committee is glad to report that one well known dealer has already given an undertaking to have no dealings whatever in a number of the insects on the Committee's list in any living stage. It is hoped that similar co-operative undertakings may be secured from other dealers, who are hereby invited to communicate with the Honorary Secretary.

The Committee would be glad at all times to receive practical suggestions from entomologists. In particular it would urge entomologists to notify the Committee at the earliest possible moment of any observed threat to a rare or local species or to its habitat, giving all the information obtainable, so that its support, and experience may be made available in framing measures necessary for their protection.

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